“DESIGN, SYNTHESIS AND INVESTIGATION OF IMPERATIVE PHARMACOPHORES DERIVED FROM SIMPLE AND FUSED HETEROCYCLES”

A synopsis submitted to

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Title of the Proposed Research Work:

"DESIGN, SYNTHESIS AND INVESTIGATION OF IMPERATIVE PHARMACOPHORES DERIVED FROM SIMPLE AND FUSED HETEROCYCLES"

Introduction:

The branch of science which deals with the study of synthesis, properties and applications of heterocyclic compounds is known as heterocyclic chemistry. The cyclic compounds in which one or more than one hetero atom like oxygen, nitrogen, sulfur, phosphorous etc. ere the member of cyclic organic compounds in place of a carbon atom are called heterocyclic ring and all organic compounds containing heterocyclic ring are called as heterocyclic compounds. Heterocyclic compounds are broadly divided as nonaromatic and aromatic heterocyclic compound. The reactivity of nonaromatic heterocyclic compounds is simple as like aliphatic compounds while the reactivity of aromatic heterocyclic compounds is interesting and more complex due to presence of heteroatoms. Depending on number of atoms present in the heterocyclic ring size may vary from three membered ring of ethylene oxide to huge structures of crown ethers and further heterocyclic compounds are divided depending on the types of heteroatom present in the ring such as oxygen, nitrogen, sulfur, etc.

Heterocyclic compounds are the most common structural unit found in medicinal chemistry and plays important role in the development of society by improving the quality of life as they have pharmacodynamics and pharmacokinetic properties. Biological activities of heterocyclic compounds shown in the following diagram which fascinates researcher to design new imperative pharmacophore derivatives of heterocyclic compounds. They are obtained either naturally from the plant extract or synthesize commercially by synthetic utilities, plenty of heterocyclic compounds where obtained by addition reaction, cyclization reaction, ring transformation or replacement involving groups, hence now a days among available organic compounds half of these found to be heterocyclic compounds and day by day this number is continuously increases very rapidly. In the US 2010 retail sale of top small drug molecules contains over 80% of heterocyclic fragments.

The main purpose of study is to synthesize imperative heterocyclic compounds by designing the natural products and marketed drugs. Obtained derivatives must have requirements, it must restrict the action of pathogenic bacteria and kill them to cure disease without harming the host

cells, distribute itself at the site where it is desired to act and do not have any toxicity to act as imperative pharmacophore.

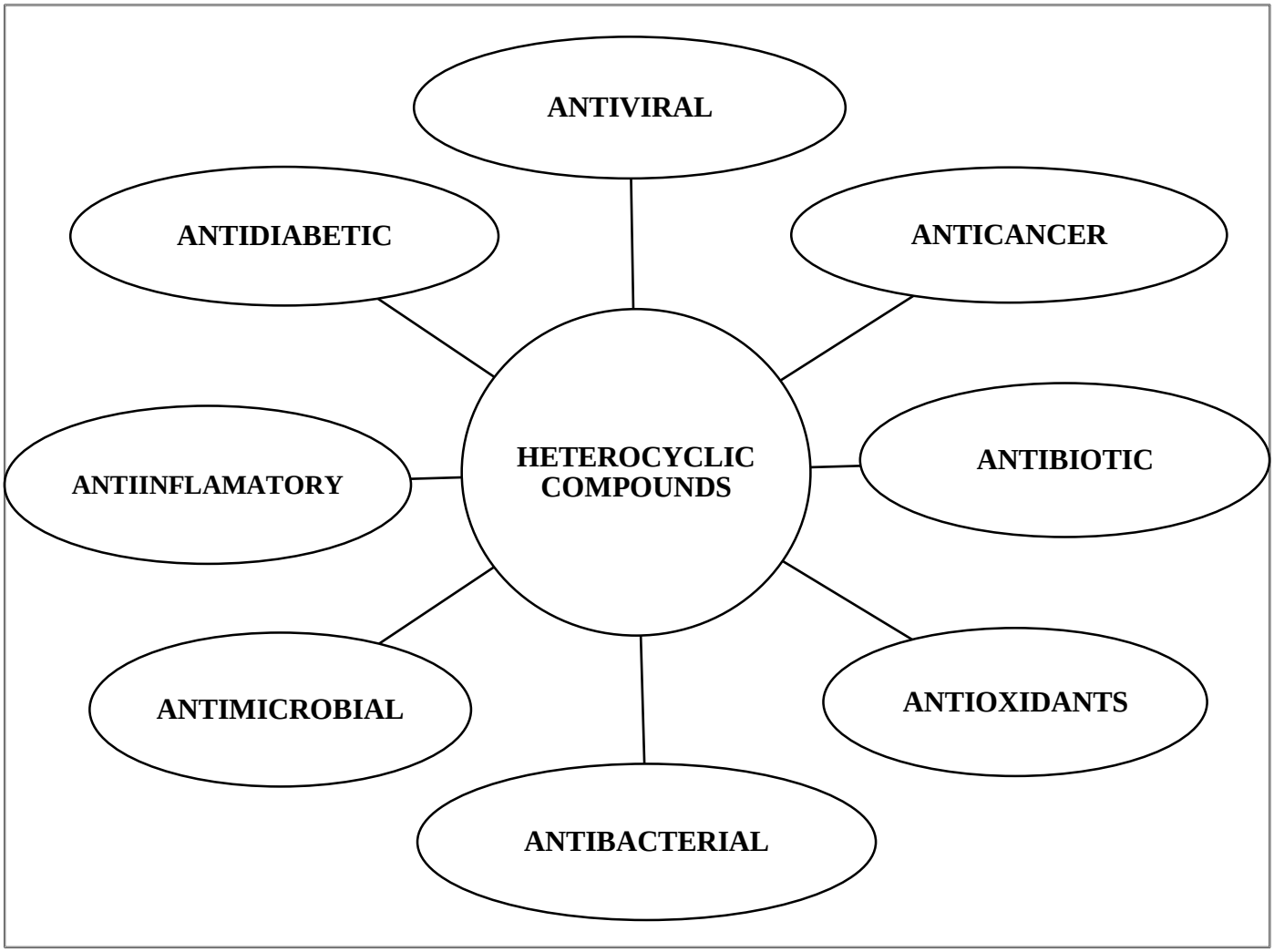
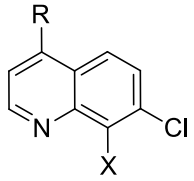
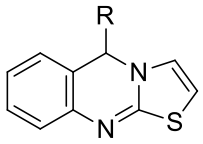
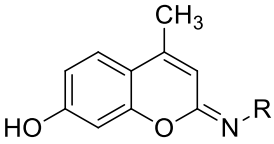
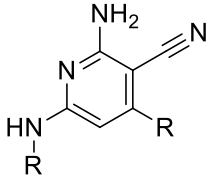
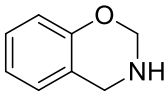
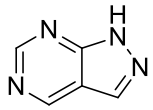
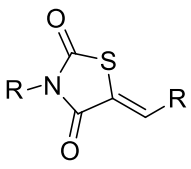


Figure 1 Biological Activities of Heterocyclic compounds

Review of Literature and Development in the subject:

Literature review of heterocyclic compounds reviles that, heterocyclic compounds are the largest family of heterocyclic chemistry. They are very important not only having plethora in biological activities but also in synthetic, pharmaceutical and industrial applications. These wide arrays of applications invade researchers to design and synthesis emerging derivatives of heterocyclic compounds.

Some important heterocyclic moiety having wide spectrum of biological applications are shown in following table.

Sr. No.	Heterocyclic Moiety	Biological Activity
1	**Chloroquine** 	Antiviral[2] (Against Corona Virus)
2	**Thiazolo quinazoline** 	Anticancer[3]
3	**Cumarine** 	Anti-inflammatory[4] and Antioxidant[4]
4	**pyridine** 	Antibacterial[5]
6	**Dihydro-2H-benzo [1, 3] oxazine** 	Antitubercular[6]
7	Pyrazolo Pyrimidine 	Antimicrobial[7]
8	**Thiazolidinedione** 	Antidiabetic[8,9]

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Objectives of research:

The objective of research work will be synthesis of ingenious pharmacophore derivatives of heterocyclic compound which promotes in design, synthesis and investigation of imperative pharmacophore derivatives of heterocyclic compounds. We have planned to synthesize series of heterocyclic compounds by using green chemistry principles and investigation of their applications for society.

Methodology:

Numerous preparative methods of organic synthesis will have been used in our work. The isolation and purification of crude products and separation of isomer will carried out by the crystallization, and column chromatography. The obtained products will be identified and characterized by elemental analysis, melting point determination, ^{1}H NMR, ^{13}C NMR, MASS and IR techniques.

Importance of study (Social Applications):

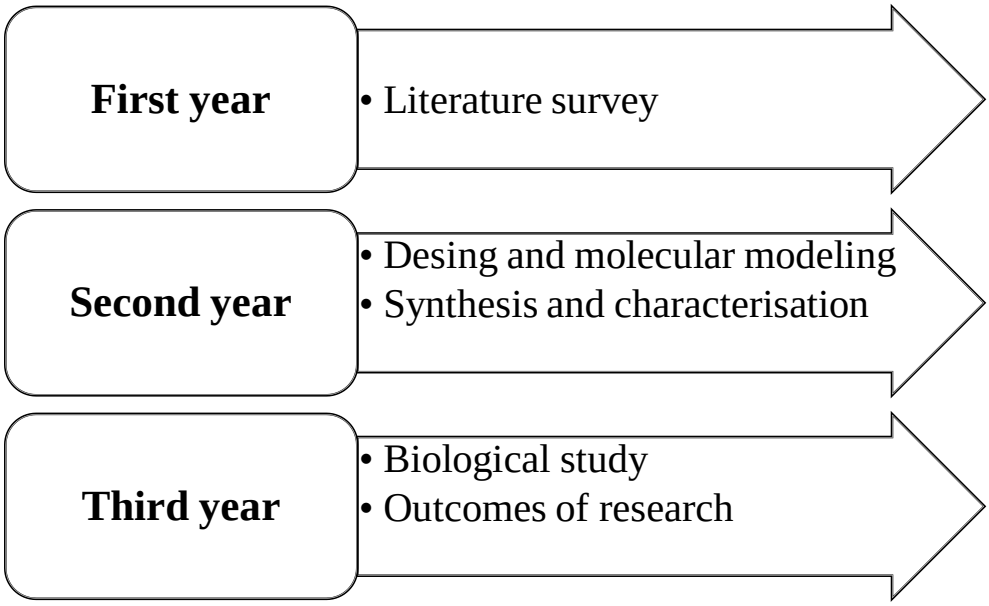
From few decades, world confront the outbreak of pandemic diseases like COVID-19, AIDS and Flue. Such a pandemic conditions increase the rate of mortality result in the deaths of more than 38 million of peoples. During the period researchers dispense the new drugs out of which 90% of drugs used in pandemic conditions are heterocyclic compounds.

Result in

The significance of heterocyclic compounds has been growing interest in the scientific community bespeak to have opportunity for design, synthesis and investigation of imperative derivatives of heterocyclic compounds.

Proposed work plan / Formulation of structured study:

Year wise plan of work and targets to be achieved



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Research Guide

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